

# Installing ERX Modules

This chapter describes how to physically install and remove ERX modules. If the modules you want are already installed in the system, you can skip this chapter and go to *Chapter 4, Cabling the ERX System*.

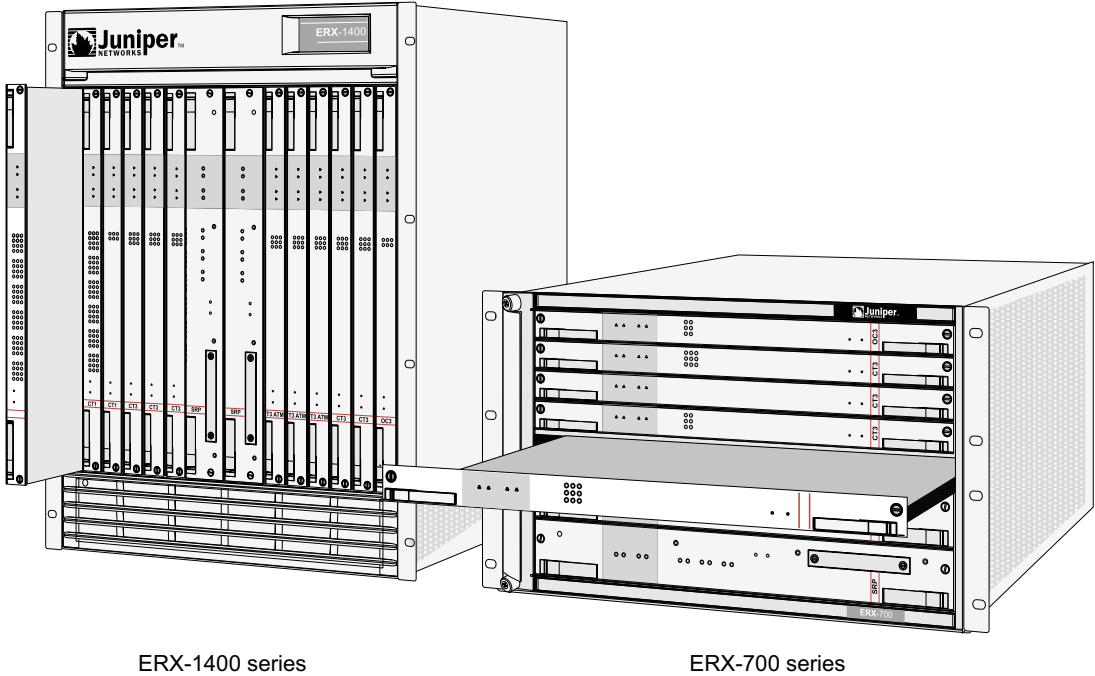
For information about managing installed modules, see *ERX System Basics Configuration Guide, Chapter 5, Managing Line Modules and SRP Modules*.

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## Overview

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In the ERX-1400 series, modules mount vertically in a chassis with 14 slots, whereas in the ERX-700 series, modules mount horizontally in a chassis with 7 slots. See Figure 3-1. For information about compatibility between lines modules and SRP modules, see Table B-1 in *Appendix B, Module Specifications*.



**Figure 3-1** Orientation of line modules in the ERX-700 series and ERX-1400 series

For details about available line modules, see *Appendix B, Module Specifications*.

### Slot Groups

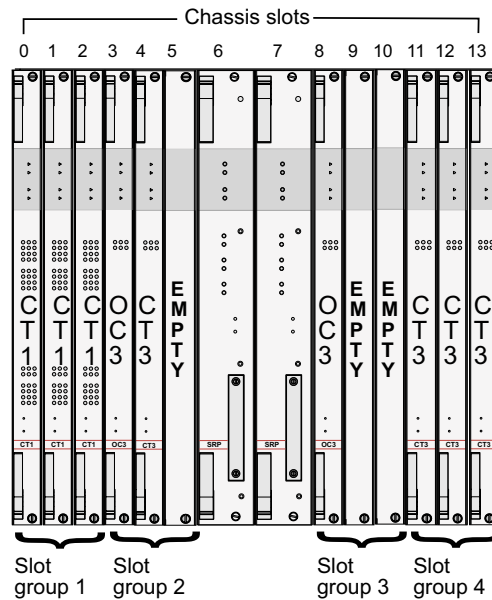
The slots in the ERX-700 series' and the ERX-1410 system's chassis are divided into groups. The number of groups and number of slots per group depend on the system. There are no slot groups in the ERX-1440 system.

#### Slot Groups for the ERX-1410 System

A slot group in the ERX-1410 system comprises three adjacent chassis slots. The groups for the ERX-1410 system consist of the following slots (Figure 3-2):

- Slot group 1 – slots 0 through 2
- Slot group 2 – slots 3 through 5
- Slot group 3 – slots 8 through 10
- Slot group 4 – slots 11 through 13

Slots 6 and 7 are reserved for the SRP modules.



**Figure 3-2** ERX-1400 slot groups

### Slot Groups for the ERX-700 Series

A slot group in the ERX-700 series comprises one slot or two adjacent slots. The groups for the ERX-700 series consist of the following slots (Figure 3-3):

- Slot group 1 – slots 2 and 3
- Slot group 2 – slot 4
- Slot group 3 – slot 5
- Slot group 4 – slot 6

Slots 0 and 1 are reserved for the SRP modules.

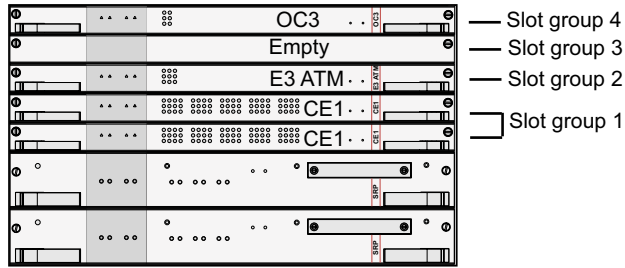


Figure 3-3 ERX-700 series slot groups

### Combinations of Line Modules

For information about allowed combinations of line modules, see *ERX System Basics Configuration Guide, Chapter 5, Managing Line Modules and SRP Modules*.

### Replacing and Managing Modules

For information about software procedures associated with replacing and managing modules, see *ERX System Basics Configuration Guide, Chapter 5, Managing Line Modules and SRP Modules*.

### Hot-Swapping Modules

The ERX-700 series and ERX-1400 series support hot-swapping of modules. Hot-swapping allows you to add or remove a module without powering down the system.

### Required Tools and Safety Items

You need the following tools to install a line module:

- A Phillips screwdriver
- An ESD (electrostatic discharge) wrist strap

### Protecting Modules and Slots

To protect the modules and slots, observe the following guidelines when installing modules:



**Caution:** When handling modules, use an antistatic wrist strap connected to the ERX system's ESD grounding jack. This action helps to protect the module from damage by electrostatic discharge.

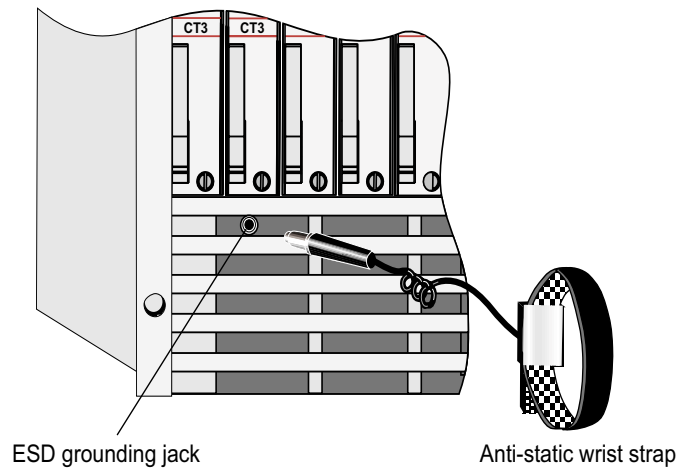
On the ERX-1400 series, the grounding jacks are inside the front bezel in the lower-left area of the front of the chassis (Figure 3-4) and in the upper-right corner on the rear of the chassis. On the ERX-700 series, the grounding jack is in the lower-right corner on the rear of the chassis.



**Caution:** Always handle the module by its edges. Do not touch the components, pins, leads, or solder connections.



**Caution:** Be sure to cover every empty slot with a blank faceplate to protect the system from dust or other foreign substances and to ensure proper system cooling.



**Figure 3-4** Connecting the wrist strap to the ERX-1400 series (front)

### *Order of Installation*

Before you attempt to install or replace a module (inserted in the front of the chassis), the corresponding I/O module (inserted in the rear of the chassis) should already be in place. The system diagnostics run when a module is installed in a chassis slot. If the corresponding I/O module is not present, the diagnostics fail, and you need to remove and reinsert the module.

## Safety Guidelines

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Before and during the installation process, observe the following precautions:



**Lightning Activity Warning:** Do not work on the system or connect or disconnect cables during lightning activity.



**DC Power Disconnection Warning:** Before powering on the ERX system, remove power from the DC circuit by deactivating the circuit breaker on the panel board that services the DC circuit.



**Jewelry Removal Warning:** Remove jewelry (including rings, necklaces, and watches) before working on equipment that is connected to power lines. Metal objects heat up when connected to power and ground and can cause serious burns or become welded to the terminals.



**Metal Objects Warning:** Do not insert any metal object, such as a screwdriver, into an open slot or the backplane. Doing so may cause electric shock and serious burns.



**Repair Warning:** Never attempt to repair parts of modules yourself. Only trained customer service personnel are authorized to service parts. Call Juniper Networks Customer Service to make arrangements to return defective modules for repair. See Appendix F, Customer Service.

## Installing SRP I/O and SRP Modules

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You should install SRP modules only in chassis slots 6 and 7 of the ERX-1400 series and slots 0 and 1 of the ERX-700 series.



**Note:** Install the SRP I/O module before you install the SRP module; otherwise, the ERX system diagnostics fail.

### Installing an SRP I/O Module

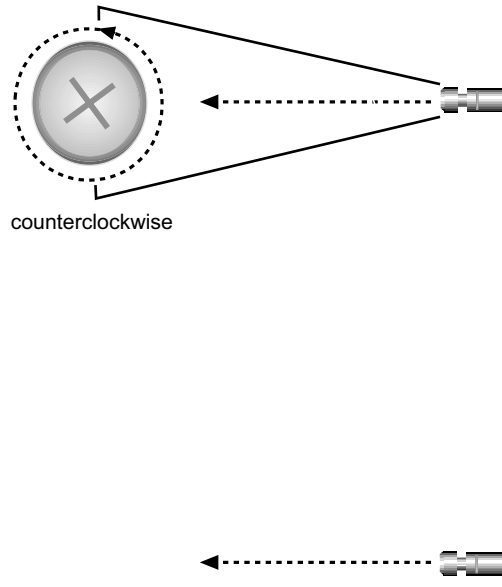
To install an SRP I/O module:

- 1 Connect the antistatic wrist strap to the ESD grounding jack on your ERX system.



**Caution:** When handling modules, use an antistatic wrist strap connected to the ERX system's ESD grounding jack. This action helps to protect the module from damage by electrostatic discharge.

- 2 With a Phillips screwdriver, loosen the top and bottom captive screws securing the blank faceplate covering the empty slot. See Figure 3-5.
- 3 Remove the faceplate.



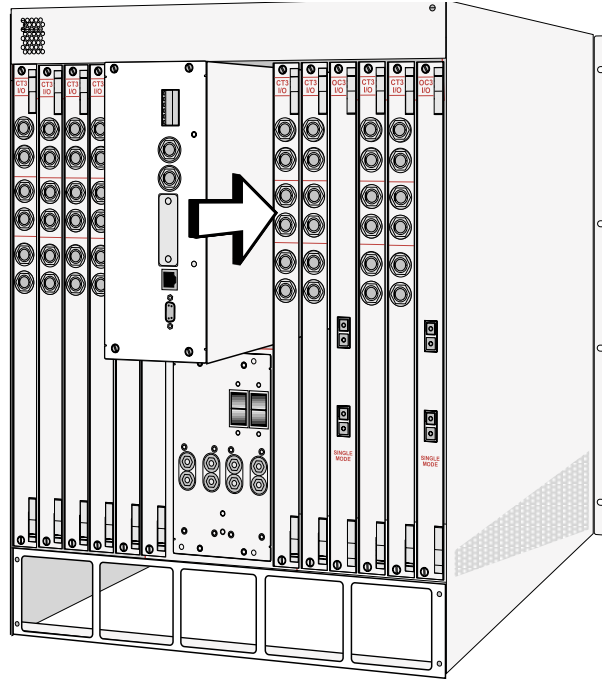
**Figure 3-5** Removing the blank faceplate



**Caution:** Always handle the module by its edges. Do not touch the components, pins, leads, or solder connections.

- 4 Remove the SRP I/O module from its antistatic bag.
- 5 Position the module as follows:
  - For the ERX-1400 series, position the module vertically so that the labeling is upright.
  - For the ERX-700 series, position the module horizontally so that the alarm leads are to the right.
- 6 Position the module into the chassis by placing it between the guides of the selected slot, and slide the module until it stops.

Figure 3-6 shows how to install an SRP I/O module in the ERX-1400 series.



**Figure 3-6** Installing an SRP I/O module in the ERX-1400 series

- 7 Tighten the module's captive screws using a Phillips screwdriver. Turn both screws several times before tightening them completely to allow the module to sit correctly.

### *Installing an SRP Module*

To install an SRP module:

- 1 Connect the antistatic wrist strap to the ESD grounding jack on your ERX system.



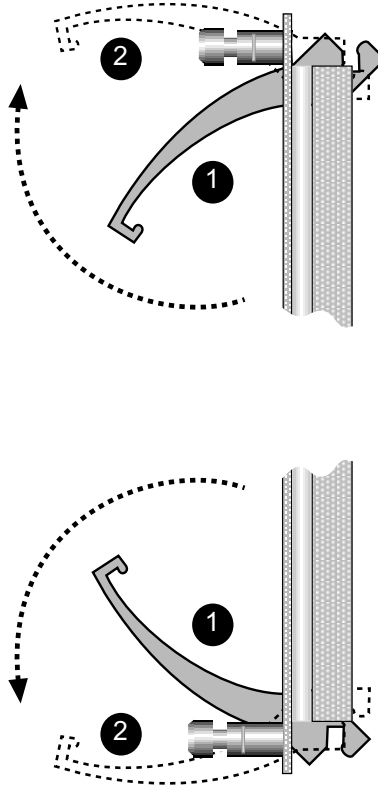
**Caution:** When handling modules, use an antistatic wrist strap connected to the ERX system's ESD grounding jack. This action helps to protect the module from damage by electrostatic discharge.

- 2 Choose the chassis slot where you want to insert the module.  
For the ERX-1400 series, use slot 6 or 7; for the ERX-700 series, use slot 0 or 1.
- 3 With a Phillips screwdriver, loosen the top and bottom screws that secure the blank faceplate covering the empty chassis slot.
- 4 Remove the faceplate.



**Caution:** Always handle the module by its edges. Do not touch the components, pins, leads, or solder connections.

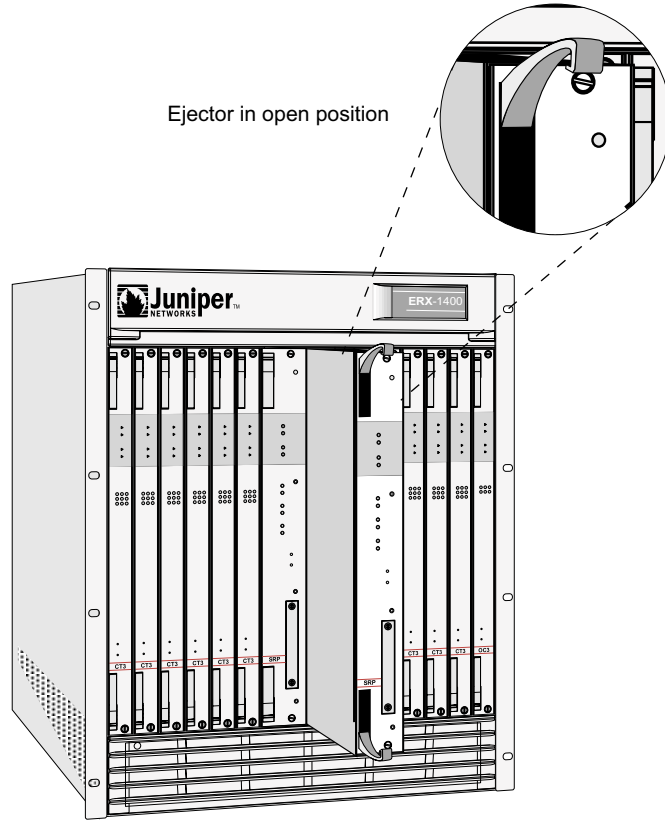
- 5 Remove the SRP module from its antistatic bag.
- 6 Make sure that the ejectors are in position 1, as shown in Figure 3-7.



**Figure 3-7** Positioning the ejectors

- 7 Position the module as follows:
  - For the ERX-1400 series, position the module vertically so that the labeling is upright.
  - For the ERX-700 series, position the module horizontally so that the labeling is to the right.
- 8 Position the module in the chassis by placing it between the guides of the selected slot, and slide the module until it stops.

The module stops sliding when the ejectors make contact with the front of the chassis. Figure 3-8 shows how to install an SRP module in the ERX-1400 series.



**Figure 3-8** Installing an SRP module

- 9 Insert the module into the backplane by simultaneously depressing both ejectors (as shown in Figure 3-7) and exerting forward pressure on the module.
- 10 Tighten the module's captive screws using a Phillips screwdriver. Turn both screws several times before tightening them completely to allow the module to sit correctly.

## Installing Line Modules and Their I/O Modules

This section describes the procedures for installing line and I/O modules.



**Note:** Install the I/O module before you install the corresponding line module; otherwise, the ERX system diagnostics fail, and after the line module has tried to reboot, its status will be “inactive” when you issue a **show version** command.

### Installing a Line or I/O Module

To install a module:

- 1 Connect the antistatic wrist strap to the ESD grounding jack on your ERX system.



**Caution:** When handling modules, use an antistatic wrist strap connected to the ERX system's ESD grounding jack. This action helps to protect the module from damage by electrostatic discharge.

- 2 Choose the slot where you want to insert the module.

For the ERX-1400 series, you can install line modules in slots 0 through 5 and slots 8 through 13; for the ERX-700 series you can choose slots 2 through 6.

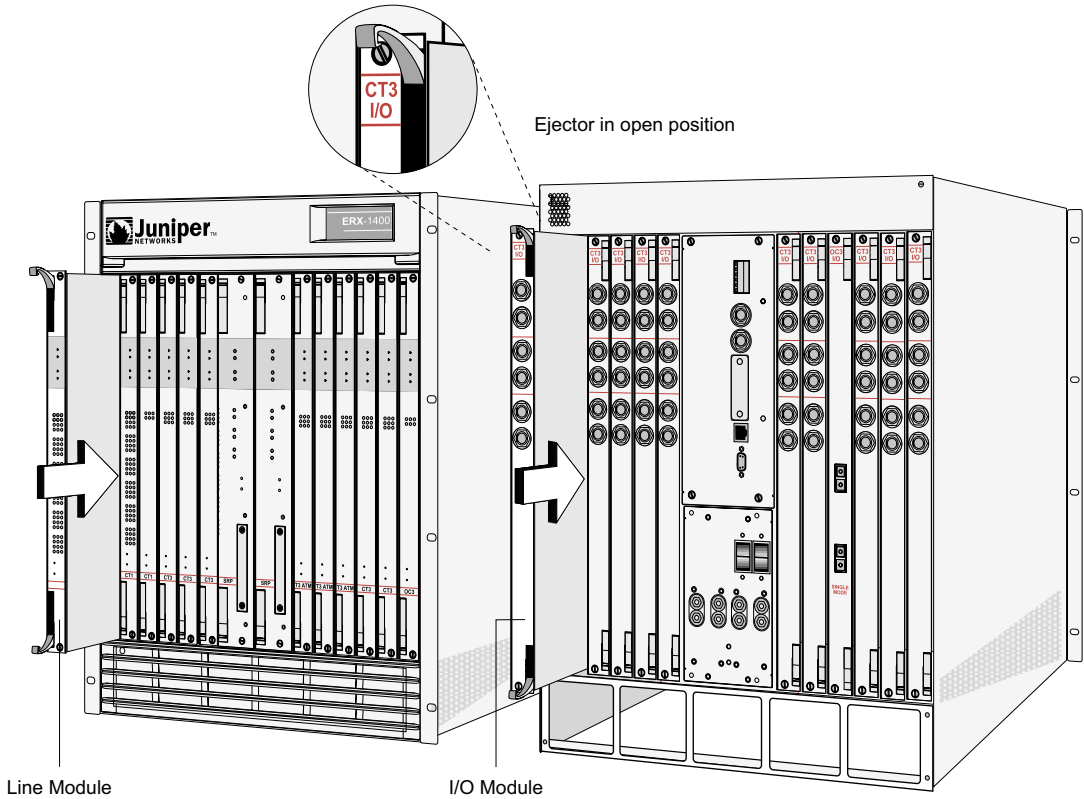
- 3 With a Phillips screwdriver, loosen the top and bottom screws that secure the blank faceplate covering the empty chassis slot, as shown in Figure 3-5.
- 4 Remove the faceplate.



**Caution:** Always handle the module by its edges. Do not touch the components, pins, leads, or solder connections.

- 5 Remove the module from its antistatic bag.
- 6 Make sure that the ejectors are in position 1, as shown in Figure 3-7.
- 7 Position the module as follows:
  - For the ERX-1400 series, position the module vertically so that the labeling is upright.
  - For the ERX-700 series, position the module horizontally so that the labeling is to the right.
- 8 Guide the module into the chassis by placing it between the guides of the selected slot, and slide the module until it stops.

The module stops sliding when the ejectors make contact with the front of the chassis. Figure 3-9 shows how to install an I/O module and a line module in the ERX-1400 series.



**Figure 3-9** Installing a module in the ERX-1400 series

- 9 Insert the module into the midplane by simultaneously depressing both ejectors (as shown in Figure 3-7) and exerting forward pressure on the module.
- 10 Tighten the module's captive screws using a Phillips screwdriver. Turn both screws several times before tightening them completely to allow the module to sit correctly.

## Removing a Module

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To remove a module:



**Caution:** If you do not use the **halt** command before removing or powering down an SRP, the system's NVS card may become corrupted.

- 1 Enter the **halt** command.

See *ERX System Basics Configuration Guide, Chapter 5, Managing Line Modules and SRP Modules* for information about the **halt** command.



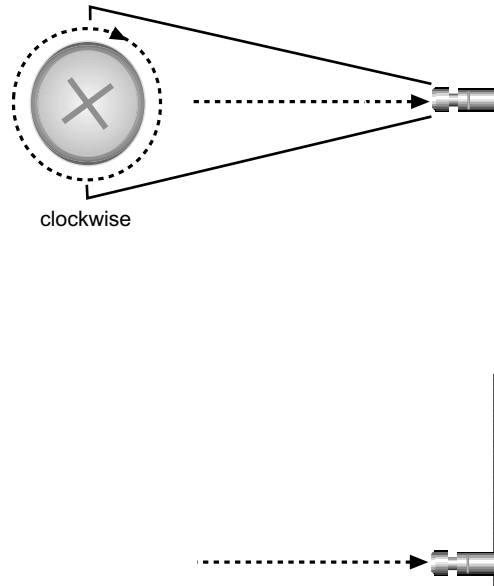
**Caution:** When handling modules, use an antistatic wrist strap connected to the ERX system's ESD grounding jack. This action helps to protect the module from damage by electrostatic discharge.

- 2 Connect the antistatic wrist strap to the ESD grounding jack on your ERX system.
- 3 Use a screwdriver to loosen the thumb screws located at the top and bottom of the module panel, as shown in Figure 3-5.
- 4 Raise the ejector handles located at the top and bottom of the module so that they are in position 2, as shown in Figure 3-7.



**Caution:** Always handle the module by its edges. Do not touch the components, pins, leads, or solder connections.

- 5 Carefully slide the module out of the chassis, as shown in Figure 3-9.
- 6 Place the module in its antistatic bag.
- 7 Cover the empty chassis slot with a blank faceplate. Tighten the faceplate's top and bottom captive screws using a Phillips screwdriver, as shown in Figure 3-10. Turn both screws several times before tightening them completely.



**Figure 3-10** Installing the blank faceplate

If you remove an I/O module and not the corresponding line module, the line module reboots, and then its status will be “inactive” when you issue a **show version** command. If you remove a line module and do not delete the corresponding configuration, the status of the line module will be “not present” when you issue a **show version** command.

## Installing Components for Line Module Redundancy

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The ERX system allows a spare line module to provide redundancy for a group of identical line modules. For line module redundancy to operate, you must install:

- The line modules, including the spare line module
- The redundancy midplane
- The I/O modules, including the redundancy I/O module



**Warning:** Do not insert any metal object, such as a screwdriver, or place your hand into an open slot or the backplane when the ERX system is on. Remove jewelry (including rings, necklaces, and watches) before working on equipment that is connected to power lines. These actions prevent electric shock and serious burns.



**Caution:** When handling modules, use an antistatic wrist strap connected to the ERX system's ESD grounding jack, and hold modules by their edges. Do not touch the components, pins, leads, or solder connections. These actions help to protect modules from damage by electrostatic discharge.

### *Installing the Line Modules*

To install the line modules in a redundancy group:

- 1 Install the spare line module in the lowest-numbered slot of the redundancy group.
- 2 Install the other line modules in the remaining slots. (See *Installing Line Modules and Their I/O Modules*, earlier in this chapter).

### *Installing the Redundancy Midplane*

To install the redundancy midplane in a redundancy group:



**Caution:** If you do not use the **halt** command before removing or powering down an SRP, the system's NVS card may become corrupted.

- 1 Enter the **halt** command.

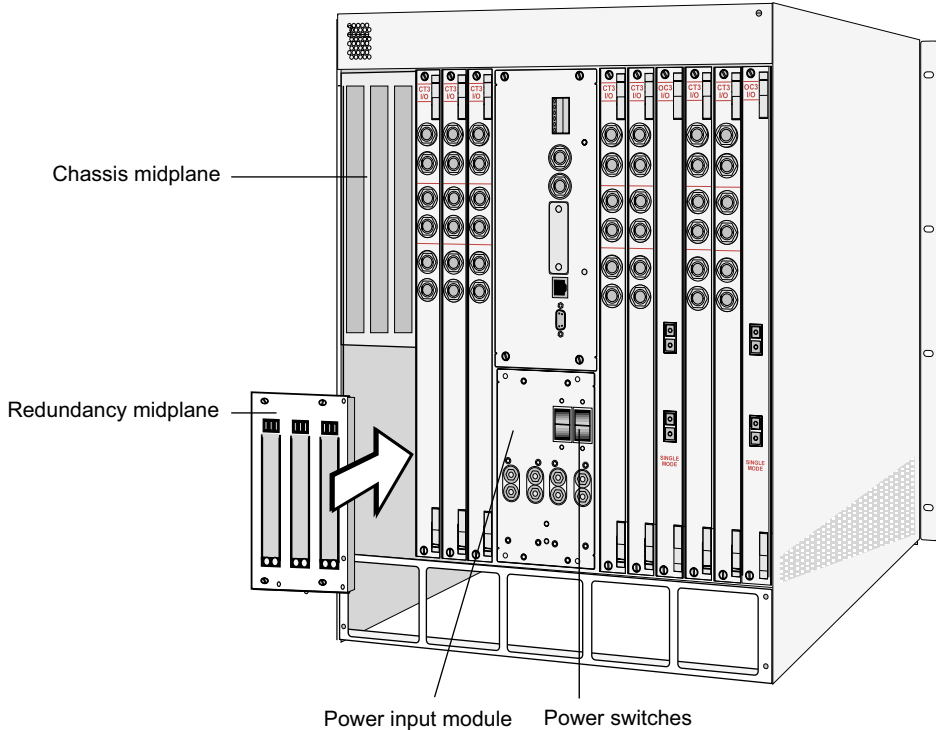
See *ERX System Basics Configuration Guide, Chapter 5, Managing Line Modules and SRP Modules* for information about the **halt** command.



**Warning:** Turn off the ERX system before you install the redundancy midplane. Working inside the ERX system when it is on can lead to electric shock and serious burns.

- 2 Turn off the power switches located on the power input module in the rear of the system (see Figure 3-11).
- 3 Remove the I/O modules from the slots that the redundancy midplane will span.
- 4 Place the redundancy midplane in the chassis so that it rests against the guides below the chassis midplane (see Figure 3-11).
- 5 Align the screw holes in the redundancy midplane with the screw holes in the guides so that the midplane covers the slots for the redundancy group.
- 6 Using a Phillips screwdriver and the screws provided, loosely attach, but do not tighten, the redundancy midplane to the guides.

- Carefully insert an I/O module in one slot to ensure that the redundancy midplane is aligned correctly; then tighten the screws.  
  
A misaligned redundancy midplane can result in bent pins on the boards and poor contact between the I/O modules and the redundancy midplane.



**Figure 3-11** Installing a redundancy midplane

### Installing the I/O Modules

To install the I/O modules in a redundancy group:

- Install the redundancy I/O module in the lowest-numbered slot of the redundancy group.



**Caution:** When setting up a redundancy group with line modules, be sure to install the redundancy I/O module in the lowest-numbered slot of the redundancy group. It is possible to install the redundancy I/O module in other slots; however, doing so may damage other I/O modules connected to the redundancy midplane.

- Install the corresponding I/O module for the line module of each slot in the redundancy group. (See *Installing a Line or I/O Module*, earlier in this chapter.)

### *Verifying the Installation*

To verify that the installation is complete:

- 1 Turn on the power switches.

The system will reboot.

- 2 Issue the **show redundancy** command, and verify that the display shows the redundancy hardware.

### **The Next Step**

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After you have installed the modules and are confident that they sit correctly in their respective chassis slots, you are ready to connect cables. For instructions on installing cables for your ERX system, see *Chapter 4, Cabling the ERX System*.

